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ABSTRACT

This paper describes a pilot program in institutional financing. It was designed to be used at a predominantly white Southwestern land grant university to increase the participation rate of black engineering students, but it may be used with slight modifications to increase the number of blacks and other minorities in other professions. In 1969 the faculty of the School of Electrical Engineering at Oklahoma State University undertook a pilot program to work with approximately 12 black undergraduate students who wanted to prepare for careers in electrical engineering. Some of the students were experiencing academic problems because of inadequate preparation for a curriculum in engineering, some were having difficulty in making social adjustments to the predominantly white campus, and some were in need of financial aid. Faculty and black students agreed to concentrate on special tutoring, special counseling and individual follow-up. The students were also provided with financial aid sources, special on-campus engineering-related activities, tutoring and periodic social sessions. The results of this pilot program were satisfactory. Minority student enrollment more than doubled during 1974-75 academic year and this trend is expected to continue. Inspired by the initial success, the university undertook the responsibility to generate additional financial support for the minority student program. An outline of a set of sequential developments used in the projection of the estimated educational cost and retention rates of minorities in engineering is provided. (Author/AM)

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THE BLACK COMMUNITY AND PROFESSIONAL EDUCATION: A PILOT PROGRAM IN INSTITUTIONAL FINANCING

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

I. INTRODUCTION

It was the late Dr. Martin Luther King, Jr. who astutely observed:

> "White America is seeking to keep the walls of segregation substantially intact while the evolution of society and the Negro's desperation is causing them to crumble. The white majority, unprepared and unwilling to accept radical structural change, is resisting and producing chaos while complaining that if there were no chaos orderly change would come" (King, 1968, p. 1).

Until very recently, the walls of segregation and discrimination in professional education for black Americans were substantially intact. The training of most of today's black professionals, particularly engineers and technicians, takes place at a few predominantly black schools. In many respects, the black experience in engineering education typifies the general conditions and relationships of the black community to the professional educational community. For example, it has been estimated that only 2 percent of the nation's 380,000 physicians are black; blacks enrolled in white schools of pharmacy constitutes less than 1 percent of all students; only about 500 blacks are among the 70,000 engineers graduating at the bachelor's, master's, and doctoral levels each year; and less than 1 out of every 100 American Ph.D. holders is black (Griffin, 1975).

After examining programs of recruitment, admission, and financial assistance for blacks pursuing professional and advanced degrees in higher education around the country, Blackwell (1975) concludes that a patchwork pattern of contrasts exists.

> "On the one hand there is support from foundations and some institutions, and on the other hand limited commitments and exclusionary policies. Even though admissions are being adjusted to facilitate the admission of large numbers of blacks and other minorities and the actual number of non-whites being admitted is increasing, the percentage gap have not narrowed significantly. For the nation as a whole, a 1973 survey of two-thirds of all institutions granting Ph.D.'s showed their total graduate enrollment to be only 4.4 percent black" (Griffin, 1975, p. 7).

Undoubtedly, the remedy for the inequitable distribution of professional and higher education in general, involves among other things, economic considerations. Blacks and other minorities must have financial aid packages that are meaningful and manageable if significant inroads are to be made in equality of educational opportunity.

Present enrollment statistics suggest that all forms of higher education are being pursued by blacks within three types of educational settings:

1) Colleges and universities which once enrolled whites exclusively but have been desegregated as a result of black awareness and agitation, court decisions, and executive orders.

2) Colleges and universities which were established especially for "Negroes" just after the Civil War, and have continued to be patronized primarily by blacks.

3) Colleges and universities formed in recent years on a fully integrated basis.

Pifer (1973) supports the contention that although the numbers of black students attending the traditional black college has continued to grow steadily in recent years, the great burgeoning of black participation in higher education is largely the result of a dramatic increase in black enrollment in what were formerly all-white or virtually all-white institutions. For example, as late as 1938, some 97 percent of all black students were enrolled in black colleges. By 1954, however, at least 40 percent of black students

were in predominantly white institutions, mainly in the North and West; and by 1970 over half (some 56 percent), were in these colleges and universities. Presently it is estimated that well over 72 percent of all black students (part-time as well as full-time)in higher education are on white campuses (Barnes, 1972; Moore and Wagstaff, 1974). A recent survey by the U.S. Census Bureau shows that since 1964 black college enrollment has increased 248 percent, compared to a total college enrollment growth of 90 percent. While it has been estimated that 9 percent of all college students are black, about 12 percent of the college age (18-21) population are black. Thus present enrollment trends are still far from being proportionate to the black population (Magarrell, 1975).

Predictably, the socio-educational significance of this shift in initiative within the black community has not yet been assessed. One may observe, however, that these developments promise to have a profound impact on the organizational arrangement in terms of curricula and instructional method of the historically white institution.

In response to the explosive debate on how the predominantly white higher educational institution may best meet the educational and social-emotional needs of the black community, social scientists and educators alike began reflecting the philosophical arguments once used to support the land grant tradition of education for the masses. Of major concern to the black community was the disproportionate low number of black graduates in engineering and related technologies, and the concomitant low number of blacks employed as engineers, technicians, and architects.

What follows is an attempt to articulate a highly successful effort to remedy a deplorable situation of too few black Americans in engineering

education. Theoretically, it is believed that the model used to increase the participation rate of black engineering students at a predominantly white Southwestern land grant university, may be used with slight modifications, to increase the number of blacks and other minorities in any one of the professional educational endeavors.

II. THE BLACK COMMUNITY: TOWARD AN UNDERSTANDING

It has been known for years now that education for blacks has been substandard. Environmental problems; historical poverty; prejudice and discrimination; the residual effects of slavery; coupled with transiency and defeatism among students, teachers, and parents have all conspired to give the black student a dysfunctional predisposition toward learning and authority in general.

By the time the typical black youth reaches high school he has gotten the message through poor report cards, frequent discipling, low test scores, teacher and counselor indifference to his problems that he is not a top candidate for college (Ekberg & Ury, 1968). And since he cannot see himself as having a realistic chance of holding professional jobs which require higher education, he does not see the purpose of being proficient. What he has seen, however, is that the so-called proficient (qualified) black as well as the deficient ones are locked into the same low status--community with substandard housing, inferior schools, menial jobs, and low incomes. Few persons ever tell him that the reason he should master mathematics, physics, or the basic sciences is so he can navigate ships, build highways, pilot jetliners, or even design sky-scrapers. Hence, it becomes difficult, if not impossible,

for him to accept these possibilities as being real, because of the lack of empirical evidence.

Thus it was assumed that these conditions are the root cause for many black students to consciously resist the academic training necessary for a professional career. As a result, there is a drastic disproportion of black engineers and related professionals in the United States today. Imagine, only ONE out of every one-hundred graduating engineer is black! It was therefore imperative for several engineering educators and a sociologist to work together for a solution to this "real world" problem.

Of equal importance, however, is the fact that without the recognition of a specific set of social and professional responsibilities to the black community, traditional engineering educational institutions and higher education in general, shall continue to be viewed with suspicion and distrust by minority group members. Additionally, there is still the need to increase awareness and understanding about the realities of the black experience in America, and show how a significant increase in the number of blacks in engineering, technology and architecture is socially desirable and attainable. These problems of sensitivity and perspective are ofttimes more difficult than the ameliorating negative impact of the black experience.

A brief review of some statistics having to do with black Americans' income, education, employment/unemployment, and housing should challenge educators in professional schools, to seriously consider the need for greater awareness and increased understanding of the black experience, which in our opinion, is their first set of social and professional responsibilities to the black community.

One of the most basic indices of status and success in American life

seems to be that of money (Merton, 1957). It takes money to acquire an education which can lead to independence, freedom, and self-respect. As a means to an end, money is power. Yet, those who need it most have the least amounts and are also less prepared to bargain for it on the open competitive market.

As reflected in Table One, the average (median) income that a black family receives has been lower than that of a white family throughout American history, which reflects the lower educational and occupational attainments of blacks, as well as the effects of discrimination.

TABLE I

Median Income of Blacks and Other Minority Families as a Percent of White Family Income, 1959-1972*

Year	% of White Income
1959	52
1960	55
1961	53
1962	53
1963	53
1964	56
1965	55
1966	60
1967	62
1968	63
1969	63
1972	67

*"Other races" account for approximately 6-10% of minority families. Hence, true figures for blacks alone would tend to be even lower.

Table Two suggests some disconcerting and unexpected relationships between black education and income which is to a great extent, the effects of historical racial conditions.

TABLE II

Median Income of Men 25 Years Old and Over
By Educational Attainment, 1969*

Level of Education	Black	White	Black Income as a % of White
A. Elementary:			
Less than 8 years	$ 2,973	$ 3,613	82
8 years	4,293	5,460	79
B. High School:			
1 - 3 years	5,222	7,309	71
4 years	6,144	8,631	71
C. College:			
4 or more years	8,567	12,437	69

*Tables One and Two: See U.S. Department of Labor--Black Americans: A Chart Book, 1971, pp. 38; 82.

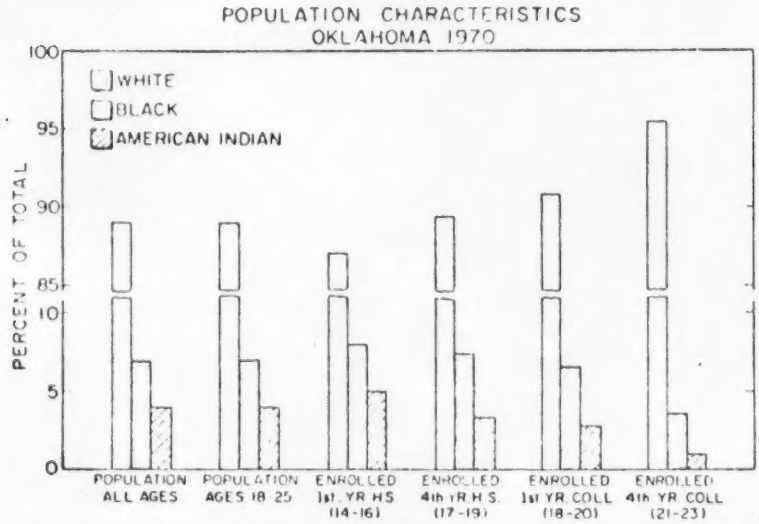
Thus at each educational level (A,B,C), blacks with the same educational attainment make less money than their white counterparts. And as can be seen, the higher the educational level the greater the proportional disparity. In terms of income, blacks tend to be discriminated against greatest as they increase their education. This phenomenon alone may account for the defeatist attitude and lack of interest in engineering education that has been observed too frequently in the black student community. More importantly, however, it

highlights the needs for financial assistance to members of the black community.

III. INSTITUTIONAL FINANCING: A PILOT PROGRAM

The Division of Engineering-Technology-Architecture, in keeping with the land-grant heritage of Oklahoma State University, was convinced that it had an obligation to provide equal opportunity for the professional education of the youth in Oklahoma. This obligation entailed more than insuring equal chances to students of equal ability. It meant that students with less initial motivation, or those from the lower income brackets, or those with socially disadvantaged background, deserve an added measure of assistance in their quest for a professional education. This type of concern is perhaps best summarized by Figure 1.

FIGURE 1



Source: U. S. Department of Commerce, Bureau of the Census, 1970 CENSUS OF POPULATION, "Detailed Characteristics, Oklahoma" tables 138 and 146 and "General Population Characteristics, Oklahoma", table 19.

The 1970 census data indicate that Oklahoma black high school graduates are enrolling in colleges and universities in numbers nearly proportionate to the black population in Oklahoma. However, disproportionately low numbers were enrolling in engineering, technology, or architecture.

Simpson and Yanger (1972) have shown that before 1950 few jobs were available to blacks in engineering, and few blacks were being trained in the field. War, legislation, the black revolution, and now affirmative action, have coalesce to create an impressive demand for black engineers and related professionals. Encouragingly, since the fifties, the enrollment of black students in engineering and related technical areas has increased, but in relative terms, not significantly. For exmaple, in 1955 only 150 or .65% of all graduating engineers were black (Howley, 1956). And among the 30,000 engineering graduates in this country in 1970 only 200 or .67% were black. As recent as 1972 out of 44,190 engineering graduates only 405 were black of which the vast majority graduated from the predominantly black schools (Smith, 1972).

One cannot help but to agree with Smith (1972) that this is a "formula for tragedy" especially when we realize that black Americans comprise over 11% of this nation's total population. Consequently, the only acceptable solution seems to be for white engineering educational institutions to take bold, innovative, all-out action to increase the supply of black engineering students. And this increase needs to be somewhere in the neighborhood of ten to fifteen-fold. Undoubtedly, this is engineering education's paramount social and professional responsibility.

Accordingly, in 1969 the faculty of the School of Electrical Engineering at Oklahoma State University undertook a pilot program to work with approximately 12 black undergraduate students who wanted to prepare for careers in

electrical engineering. Some of the students were experiencing academic problems because of inadequate preparation for a curriculum in engineering, some were having diffifulty in making social and cultural adjustments to the predominantly white campus life, and some were in need of financial aid.

In initial discussions, the students made it clear that they neither wanted nor expected academic concessions, and none were made. Instead, faculty and student agreed to concentrate on special tutoring (in addition to the on-going tutoring program in the division), special counseling, and individual follow-up. Liaison was established with their high school black counselors. A black graduate student worked closely with faculty and students with the result that 5 students earned their B.S. degrees, 2 went on to earn their M.S. degrees, and the black graduate student earned his Ph.D. degree. (Incidentally, the retention rate exceeded the norm for all students in the Division of Engineering-Technology-Architecture.)

In the spring of 1973, the division employed a black professional sociologist/counselor to recruit students, to counsel them, and to coordinate their educational programs. Additionally, we provided the recruited students with sources for the necessary finances, special on-campus engineering-related activities, tutoring and periodic social sessions.

In the summer of 1973, the division sponsored a summer session for preparatory course work and orientation engineering, technology, and architecture. Twenty-nine black students were recruited and enrolled. Of these, 13 enrolled in engineering, technology, or architecture for the fall semester and 13 enrolled in other educational programs either at OSU or at other institutions. An additional 12 black students enrolled for the first time in the fall semester of 1973, to make a total of 25 freshman black students in engineering-

Technology-Architecture. The cost of recruitment, counseling and guidance, and the expenses incurred by each student during the summer session were underwritten by the Division of Engineering-Technology-Architecture.

Already the results of our initial efforts show that we were more than successful. Our investments in people have begun to pay off. Minority student enrollment more than doubled during the 1974-75 academic year; and we foresee this trend continuing well into the decade.

Educational Cost, Analyses and Projections

Inspired by the initial success, the division undertook the responsibility to generate additional financial support for the minority student program. What follows is an outline of a set of sequential developments used in the projection of the estimated educational cost and retention rates of minorities in engineering. These should prove instructive.

It was determined that additional financial assistance was needed above and beyond those guaranteed by the family, the institution, and governmental agencies. Thus, a council of partners was formed between engineering-related industries, the black community, governmental agencies, and the Division of Engineering. Each partner was charged with the responsibility of sharing in the management and financing of the program.

The recognized costs for a full-time student to attend Oklahoma State University are determined by the Office of Financial Aids in compliance with Federal guidelines governing the amount and kind of allowable financial aid. Cost projections for this suggested program deviate from the standard in two areas: (1) other estimates of inflation are higher than the approximate 4 percent used here, and (2) the item for special tutoring and counseling is an

addition.

Figure II illustrates the method used to determine the mean cost per full-time student per academic year for a nine-year period, 1972-1982.

FIGURE II.

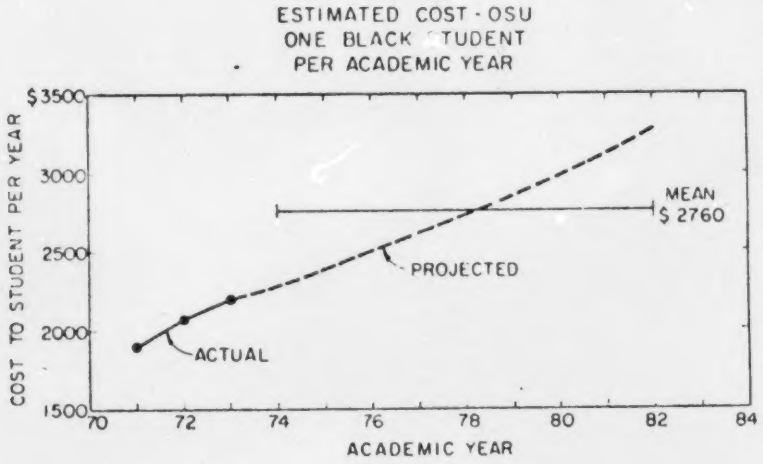


Figure III shows the major budgetary items for one student for one academic year.

FIGURE III.

ESTIMATED BUDGET
ONE ACADEMIC YEAR FOR BLACK STUDENTS
DIVISION OF ENGINEERING - TECHNOLOGY - ARCHITECTURE
OKLAHOMA STATE UNIVERSITY

ONE STUDENT:	
TUITION AND FEES	$ 600.00
BOOKS AND SUPPLIES	250.00
ROOM AND BOARD	1,160.00
TRANSPORTATION	100.00
PERSONAL ITEMS: MEDICAL, LAUNDRY, CLOTHING, ETC	500.00
TUTORING	150.00
TOTAL BUDGET	$ 2,760.00

Figure IV shows the major budgetary items for one student for one session of the summer preparatory program.

FIGURE IV

ESTIMATED BUDGET
SUMMER PREPARATORY PROGRAM
FOR BLACK STUDENTS
DIVISION OF ENGINEERING - TECHNOLOGY - ARCHITECTURE
OKLAHOMA STATE UNIVERSITY

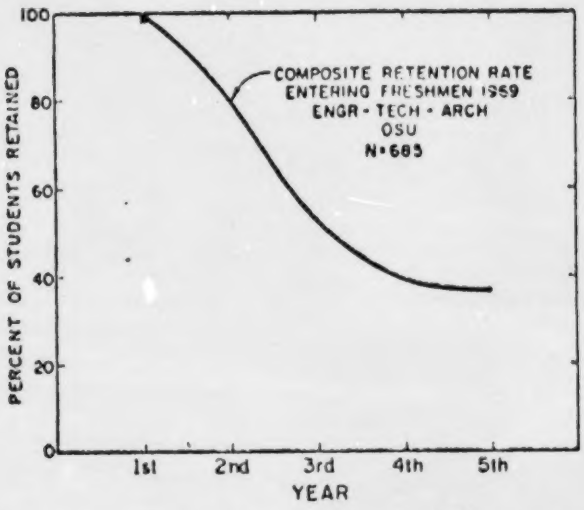
ONE STUDENT	
TUITION AND FEES	$ 120.00
BOOKS AND SUPPLIES	70.00
ROOM AND BOARD	240.00
TUTORING AND ORIENTATION	70.00
PERSONAL ITEMS MEDICAL, CLOTHING, LAUNDRY, TRANSPORTATION, ETC.	100.00
TOTAL BUDGET	$ 600.00

Projected Retention Rates

There is one factor that may not be generally recognized in circles outside the university community. Nationwide studies indicate that approximately one out of three students entering publicly supported universities attain their initial educational objectives. In other words, the "drop-out" rate (for all students) generally ranges from 60 to 75%.

Figure V shows a composite of the actual retention rates for students in the disciplines of engineering, technology, and architecture at Oklahoma State University. Many of the entering students transferred to other disciplines and successfully completed other academic programs.

FIGURE V



Source: Office of the Registrar, OSU, STUDENT INFORMATION LISTS and GRADE AVERAGE LISTINGS, 1969-73 and Office of the Dean of Engineering

Figure VI shows the estimated retention rates, expressed in terms of a full-time student equivalent (FTE), used in subsequent cost and summer employment projections.

FIGURE VI

	Retention Rate	FTE
1st year	100%	1.0
2nd year	68%	.68
3rd year	44%	.44
4th year	33%	.33
5th year	30%	.30

Projected Aid From Industry

The preceding paragraphs summarized the major factors considered in determining the total per student costs for the suggested program. Although continuation of federal programs is often unpredictable, present indications are that existing financial aid programs can provide approximately 63 percent of the financial aid for the total program. The remainder will come from the student's family and industry's contribution.

Since most families are unable to contribute to the educational expenses of the minority student, Figure VII summarizes only the financial supplement projected for industry to sponsor one minority student entering the program each year for the next five years.

FIGURE VII

PROJECTED FINANCIAL CONTRIBUTION FROM INDUSTRY
FOR ONE BLACK STUDENT ENTERING EACH YEAR 1974 - 1978
DIVISION OF ENGINEERING - TECHNOLOGY - ARCHITECTURE
OKLAHOMA STATE UNIVERSITY

ACADEMIC YEAR	TOTAL SUPPLEMENT	PROJECTED ANNUAL DISTRIBUTION					
		SUMMER (1 FTE)	1st YEAR (1 FTE)	2nd YEAR (.68 FTE)	3rd YEAR (.44 FTE)	4th YEAR (.33 FTE)	5th YEAR (.30 FTE)
1974	$2160	$600	$620				
1975	2160	600	620	$375			
1976	2160	600	620	375	$235		
1977	2160	600	620	375	235	$175	
1978	2160	600	620	375	235	175	$155
1979				375	235	175	155
1980					235	175	155
1981						175	155
1982							155
	$10,800						

In Figure VIII we see the projected summer job requirements for each black student entering the program. This can provide a substantial portion of the total educational costs.

FIGURE VIII

BLACK STUDENT FLOW AND SUMMER JOB REQUIREMENTS
ONE STUDENT ENTERING PER YEAR 1974-1978

	FULL-TIME EQUIVALENT STUDENTS						
ACADEMIC YEAR	1st YEAR	2nd YEAR	3rd YEAR	4th YEAR	5th YEAR	FTE ENROLLED	SUMMER JOBS REQUIRED
1974	1.00					1.00	0
1975	1.00	.68				1.68	.68
1976	1.00	.68	.44			2.12	1.12
1977	1.00	.68	.44	.33		2.45	1.45
1978	1.00	.68	.44	.33	.30	2.75	1.75
1979		.68	.44	.33	.30	1.75	1.75
1980			.44	.33	.30	1.07	1.07
1981				.33	.30	.63	.63
1982					.30	.30	.30

Having developed the various cost projections and adequate financial policies and procedures for handling the funds contributed by the participating partners, the program was set in motion. Presently, approximately 90 black students are deriving direct financial benefits from this innovative approach to the financing of minorities in higher education.

IV. CONCLUSION

When we examine the problems surrounding the rising unit cost in higher education--the resources it takes to educate one student, we can begin to appreciate the concerns of many higher education administrators about current operating expenses which constitute their most serious worry. Each year colleges and universities should have enough current funds to meet commitments for on-going programs and services.

The expenses for faculty and staff salaries, and operating costs related to instruction continue to be the largest items in the college budget. And while cost related to these obligations have been on the increase, federal support is practically non-existent. Thus, it can be said that the financial squeeze in postsecondary education is a consequence of the continuing imbalance between unrestricted current income that is available for educational purposes, and outlays for instruction and related supportive activities--student education expenditures.

There seems to be five basic types of general expenditures related to students' educational needs:

1) Instruction and departmental research
2) Extension and public service
3) libraries
4) physical plant operation and maintenance
5) administration and student services.

We have outlined one approach to the solution of these problems. It is hoped that others are forthcoming. Nevertheless, we have attempted to show that inspite of these recessionary problems, innovative approaches to financing professional education of blacks and other minorities are possible, and should be implemented.

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